

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Gary Edward Trewiler et al.	:	
	:	Group Art Unit: 3726
Serial Number: 10/713,493	:	
	:	Examiner: Afzali, Sarang
Filed: November 14, 2003	:	
	:	
For: METHOD FOR REPAIRING GAS	:	
TURBINE ROTOR BLADES	:	

APPELLANTS' REPLY BRIEF

Mail Stop Appeal Brief-Patents
Hon. Commissioner of Patents and Trademarks
P.O. Box 1450
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In response to the Examiner's Answer dated March 23, 2010, Appellants submit the present Reply Brief.

REMARKS

The Examiner's Answer dated March 23, 2010 has been carefully reviewed and the following remarks have been made in consequence thereof. In particular, this Reply Brief is being filed in response to the Response to Argument section set forth on pages 9-11 of the Examiner's Answer.

In response, Appellants respectfully submit initially that at least paragraph [0022] provides support for "providing a replacement blade portion that is produced using a substantially similar method as was used to produce the removed portion wherein the method includes at least one of forging and casting," as is recited in Claim 1. For example, paragraph [0022] of the originally filed specification recites, in part, "[a]dditionally, undamaged portion 120 may be fabricated from a material similar to damaged portion 90 thereby more closely matching the original material, i.e. forged vs. cast."

Moreover, Appellants respectfully submit that, when producing a replacement blade portion that closely matches an "original material, i.e., forged vs. cast," it would be recognized by persons of ordinary skill in the art, that a "forged original material" is made by forging and that a "cast original material" is made by casting. That is, a forged material cannot be produced using a fabrication method other than forging, and a cast material cannot be produced using a fabrication method other than casting. As such, to produce a replacement blade portion that closely matches an "original material, i.e., forged vs. cast," the replacement blade must be "produced using a substantially similar method as was used to produce the removed portion wherein the method includes at least one of forging and casting," as is recited in Claim 1.

The Examiner acknowledges that similar methods of manufacturing may result in a similar part or material being fabricated (i.e. casting to produce cast material and forging to produce forged material). However, the Examiner disagrees with the above argument, asserting that one cannot use a blanket statement that many different casting techniques (all considered as similar casting methods) and many different forging techniques (all considered as similar forging methods) would result in the same cast and

forged parts, respectively.

Appellants respectfully submit that the assertion in the Examiner's Answer is a mischaracterization of the arguments made and the claimed element. The recitation in Claim 1, "produced using a substantially similar method as was used to produce the removed portion wherein the method includes at least one of forging and casting," does not describe nor suggest many different casting techniques and many different forging techniques. Rather, in contrast to the assertion in the Examiner's Answer, it refers only to a technique that is substantially similar to the one that was used to produce the removed portion. Certainly, parts may be fabricated using many different processes and using many different materials. One of ordinary skill in the art would recognize that for the replacement tip to "closely match the original material, i.e. forged vs. cast," as described in the specification, both the material and the process used to fabricate the part need to be controlled. Carefully selecting the material for the replacement tip while allowing the tip to be fabricated using any process will not produce a replacement tip that closely matches the original material. Similarly, carefully controlling the process, but not selecting the same material will also not produce a replacement tip that closely matches the original material. As such, closely matching the original material requires both the composition of the material and the process used to fabricate the material into the component to be substantially similar to the original composition and process.

In response to the question posed in the Examiner's Answer, "[u]sing the rationale by the Appellants, can one conclude that a cast iron replacement part made by casting method is equally suited to be welded to the existing cast titanium alloy blade portion?" the answer is no. For the material to be substantially similar, the composition of the material and the process used to form it both need to be substantially similar.

The Examiner's Answer further asserts that "the casting and forging processes used for the replacement parts can be made by vastly different casting and forging processes (and thus not be "substantially similar"), and yet still be made of the same materials." Appellants respectfully disagree. Using the same or original material, for example, a certain grade of steel to fabricate replacements tips using different casting or

forging processes, will not produce replacement tips of the same or original material. Likewise, fabricating a replacement tip using the same or original material as was used to fabricate the original blade will not result in the replacement tip closely matching the original material if a substantially similar process as was used to form the original blade is not used to form the replacement tip.

Accordingly, Appellants respectfully submit that Claims 1, 3, 5, 6, and 22 comply with the requirements of Section 112, first paragraph.

With respect to the prior art rejections, the Examiner's Answer asserts that "Wachtell et al. explicitly teach a method of repairing a damaged hollow turbine blade by removing a damaged area and inserting a replacement section (of the same material as the original component, i.e. nickel alloy, titanium alloy, col. 3, lines 4-9 and made by similar "casting" method as original damaged portion, col. 1, lines 49-58 & col. 2, lines 42-49)." However, Appellants respectfully submit that in contrast, Wachtell actually describes at Column 1, lines 49-58 that "[w]e have found that such vanes can be reworked by cutting out a longitudinal section containing the defect and welding in its place a longitudinal insert of the same material containing columnar grains, so that the reworked vane is even better than the vane as originally cast." (Emphasis added). Accordingly, although Wachtell indicates the material is the same, Wachtell also describes that the longitudinal insert has columnar grains, which make the vane better than as originally cast. Because the reworked vane has different properties than the damaged area, it is not a replacement blade portion that closely matches the original material.

Moreover, at Column 2, lines 39-43, Wachtell describes "airfoil sections having a metallographic structure characterized by equiaxed grains tend to fail by thermal shock at, for example, the trailing edge, due to thermal cracking occurring in grain boundaries disposed transverse to the trailing edge." And, at Column 2, lines 43-47, Wachtell further describes that "[t]hese vanes are reworked or overhauled by cutting out a longitudinal section containing the defect and welding in its place in the cut-out portion a longitudinal insert having columnar grains which run along the trailing edge." Again, Wachtell describe a replacement section fabricated of a different material (one having a different

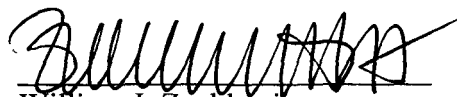
metallographic structure) than that of the damaged portion.

The descriptions of Wachtell reinforce the argument that to match the original material, a substantially similar material and a substantially similar process must be used when fabricating the replacement tip. Additionally, Wachtell does not describe nor suggest “providing a replacement blade portion that is produced using a substantially similar method as was used to produce the removed portion wherein the method includes at least one of forging and casting” as is required by Claim 1. Wachtell does not even describe or suggest “undamaged portion 120 may be fabricated from a material similar to damaged portion 90 thereby more closely matching the original material” as described in the originally filed specification.

CONCLUSION

In addition to the reasons set forth in the Appellants’ Appeal Brief, the rejections of the claims on appeal are submitted to be in error for the reasons set forth above. For at least the reasons set forth above, Appellants respectfully request that the Office’s rejections be reversed and that Claims 1, 3, 5, 6, and 22 be allowed.

Respectfully submitted,



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